

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-57 (cancelled)

LISTING OF CLAIMS

58. (New) A bake-hardenable cold rolled steel sheet having excellent formability, comprising: in weight% , 0.003 ~ 0.005 % of C, 0.003 ~ 0.03 % of S, 0.01 ~ 0.1 % of Al, 0.02 % or less of N, 0.2 % or less of P, at least one of 0.03 ~ 0.2 % of Mn and 0.005 ~ 0.2 % of Cu, and the balance of Fe and other unavoidable impurities;

when the steel sheet comprises one of Mn and Cu, the composition of Mn, Cu, and S satisfying at least one following relationships: $0.58 * Mn / S \leq 10$ and $1 \leq 0.5 * Cu / S \leq 10$, and

when the steel sheet comprises both Mn and Cu, the composition of Mn, Cu, and S satisfying the following relationships: $Mn + Cu \leq 0.3$ and $2 \leq 0.5 * (Mn + Cu) / S \leq 20$;

and

the steel sheet comprising one or more precipitates selected from the group of MnS, CuS, and (Mn, Cu)S having an average size of 0.2 μm or less.

59. (New) A bake-hardenable cold rolled steel sheet having excellent formability, comprising: in weight%, 0.003 ~ 0.005 % of C, 0.005 ~ 0.03 % of S, 0.01 ~ 0.1 % of Al, 0.02 % or less of N, 0.2 % or less of P, 0.05 ~ 0.2 % of Mn, and the balance of Fe and other unavoidable impurities;

the composition of Mn and S satisfying the following relationship: $0.58 * Mn / S \leq 10$; and

the steel sheet comprising MnS precipitates having an average size of 0.2 μm or less.

60. (New) The steel sheet as set forth in claim 59, wherein the steel sheet comprises 0.015 % or less of P.

61. (New) The steel sheet as set forth in claim 59, wherein the steel sheet comprises 0.004 % or less of N.

62. (New) The steel sheet as set forth in claim 59, wherein the steel sheet comprises 0.03 ~ 0.2 % of P.

63. (New) The steel sheet as set forth in claim 59, wherein the steel sheet further comprises at least one of 0.1 ~ 0.8 % of Si, and 0.2 ~ 1.2 % of Cr.

64. (New) The steel sheet as set forth in claim 59, wherein the steel sheet comprises 0.005 ~ 0.02 % of N, and 0.03 ~ 0.06 % of P.

65. (New) The steel sheet as set forth in claim 64, wherein a composition of Al and N satisfies the relationship: $1 \leq 0.52 * Al/N \leq 5$.

66. (New) The steel sheet as set forth in claim 59, further comprising 0.01 ~ 0.2 % of Mo.

67. (New) The steel sheet as set forth in claim 63, further comprising 0.01 ~ 0.2 % of Mo.

68. (New) A bake-hardenable cold rolled steel sheet having excellent formability, comprising: in weight%, 0.003 ~ 0.005 % of C, 0.003 ~ 0.025 % of S, 0.01 ~ 0.08 % of Al, 0.02 % or less of N, 0.2 % or less of P, 0.01 ~ 0.2 % of Cu, and the balance of Fe and other unavoidable impurities;

the composition of Cu and S satisfying the following relationship: $1 \leq 0.5 * Cu/S \leq 10$; and

the steel sheet comprising CuS precipitates having an average size of 0.1 μm or less.

69. (New) The steel sheet as set forth in claim 68, wherein the steel sheet comprises 0.015 % or less of P.

70. (New) The steel sheet as set forth in claim 68, wherein the steel sheet comprises 0.004 % or less of N.

71. (New) The steel sheet as set forth in claim 68, wherein the composition of Cu and S satisfies the relationship: $1 \leq 0.5 * \text{Cu}/\text{S} \leq 3$.

72. (New) The steel sheet as set forth in claim 68, wherein the steel sheet comprises 0.03 ~ 0.2 % of P.

73. (New) The steel sheet as set forth in claim 68, wherein the steel sheet further comprises at least one of 0.1 ~ 0.8 % of Si, and 0.2 ~ 1.2 % of Cr.

74. (New) The steel sheet as set forth in claim 68, wherein the steel sheet comprises 0.005 ~ 0.02 % of N, and 0.03 ~ 0.06 % of P.

75. (New) The steel sheet as set forth in claim 74, wherein a composition of Al and N satisfies the relationship: $1 \leq 0.52 * \text{Al}/\text{N} \leq 5$.

76. (New) The steel sheet as set forth in claim 68, further comprising 0.01 ~ 0.2 % of Mo.

77. (New) The steel sheet as set forth in claim 73, further comprising 0.01 ~ 0.2 % of Mo.

78. (New) A bake-hardenable cold rolled steel sheet having excellent formability, comprising: in weight%, 0.003 ~ 0.005 % of C, 0.003 ~ 0.025 % of S, 0.01 ~ 0.08 % of Al, 0.02 % or less of N, 0.2 % or less of P, 0.03 ~ 0.2 % of Mn, 0.005 ~ 0.2 % of Cu, and the balance of Fe and other unavoidable impurities;

the composition of Mn, Cu, and S satisfying the following relationships:
 $Mn+Cu \leq 0.3$ and $2 \leq 0.5 * (Mn+Cu) / S \leq 20$; and

the steel sheet comprising MnS, CuS, and (Mn, Cu)S precipitates having an average size of $0.2 \mu m$ or less.

79. (New) The steel sheet as set forth in claim 78, wherein the steel sheet comprises 0.015 % or less of P.

80. (New) The steel sheet as set forth in claim 78, wherein the steel sheet comprises 0.004 % or less of N.

81. (New) The steel sheet as set forth in claim 78, wherein the number of precipitates is 2×10^6 or more per unit area (mm^2).

82. (New) The steel sheet as set forth in claim 78, wherein the composition of Mn, Cu and S satisfies the relationship: $2 \leq 0.5 * (Mn+Cu) / S \leq 7$.

83. (New) The steel sheet as set forth in claim 82, wherein the number of precipitates is 2×10^8 or more per unit area (mm^2).

84. (New) The steel sheet as set forth in claim 78, wherein the steel sheet comprises 0.03 ~ 0.2 % of P.

85. (New) The steel sheet as set forth in claim 78, wherein the steel sheet further comprises at least one of 0.1 ~ 0.8 % of Si, and 0.2 ~ 1.2 % of Cr.

86. (New) The steel sheet as set forth in claim 78, wherein the steel sheet comprises 0.005 ~ 0.02 % of N, and 0.03 ~ 0.06 % of P.

87. (New) The steel sheet as set forth in claim 86, wherein a composition of Al and N satisfies the relationship: $1 \leq 0.52 * Al / N \leq 5$.

88. (New) The steel sheet as set forth in claim 78, further comprising 0.01 ~ 0.2 % of Mo.

89. (New) The steel sheet as set forth in claim 85, further comprising 0.01 ~ 0.2 % of Mo.

90. (New) A method of manufacturing a bake-hardenable cold rolled steel sheet having excellent formability, comprising the steps of:

hot-rolling a steel slab with finish rolling at an Ar_3 transformation temperature or more to provide a hot rolled steel sheet, after reheating the steel slab to a temperature of 1,100 °C or more,

the steel slab comprising: in weight%, 0.003 ~ 0.005 % of C, 0.005 ~ 0.03 % of S, 0.01 ~ 0.1 % of Al, 0.02 % or less of N, 0.2 % or less of P, 0.05 ~ 0.2 % of Mn, and the balance of Fe and other unavoidable impurities; and

the composition of Mn and S satisfying the following relationship:
 $0.58 * Mn / S \leq 10$;

cooling the steel sheet at a speed of 200 °C /min or more;

winding the cooled steel sheet at a temperature of 700 °C or less and then cold rolling the steel sheet; and

continuous annealing the cold rolled steel sheet so as to obtain the cold rolled steel sheet comprising MnS precipitates having an average size of 0.2 μm or less.

91. (New) The method as set forth in claim 90, wherein the steel slab comprises 0.015 % or less of P.

92. (New) The method as set forth in claim 90, wherein the steel slab comprises 0.004 % or less of N.

93. (New) The method as set forth in claim 90, wherein the steel slab comprises 0.03 ~ 0.2 % of P.

94. (New) The method as set forth in claim 90, wherein the steel slab further comprises at least one of 0.1 ~ 0.8 % of Si, and 0.2 ~ 1.2 % of Cr.

95. (New) The method as set forth in claim 90, wherein the steel slab comprises 0.005 ~ 0.02 % of N, and 0.03 ~ 0.06 % of P.

96. (New) The method as set forth in claim 95, wherein a composition of Al and N satisfies the relationship: $1 \leq 0.52 * Al/N \leq 5$.

97. (New) The steel sheet as set forth in claim 90, wherein the steel slab further comprises 0.01 ~ 0.2 % of Mo.

98. (New) The steel sheet as set forth in claim 94, wherein the steel slab further comprises 0.01 ~ 0.2 % of Mo.

99. (New) A method of manufacturing a bake-hardenable cold rolled steel sheet having excellent formability, comprising the steps of:

hot-rolling a steel slab with finish rolling at an Ar_3 transformation temperature or more to provide a hot rolled steel sheet, after reheating the steel slab to a temperature of 1,100 °C or more,

the steel slab comprising: in weight% , 0.003 ~ 0.005 % of C, 0.003 ~ 0.025 % of S, 0.01 ~ 0.08 % of Al, 0.02 % or less of N, 0.2 % or less of P, 0.01 ~ 0.2 % of Cu , the balance of Fe and other unavoidable impurities and,

the composition of Cu and S satisfying the following relationship: $1 \leq 0.5 * Cu/S \leq 10$ in terms of weight; cooling the steel sheet at a speed of 300 °C/min or more; winding the cooled steel sheet at a temperature of 700 °C or less and then cold rolling the steel sheet; and

continuous annealing the cold rolled steel sheet so as to obtain the cold rolled steel sheet comprising CnS precipitates having an average size of 0.2 μm or less.

100. (New) The method as set forth in claim 99, wherein the steel slab comprises 0.015 % or less of P.

101. (New) The method as set forth in claim 99, wherein the steel slab comprises 0.004 % or less of N.

102. (New) The method as set forth in claim 99, wherein the composition of Cu and S satisfies the relationship: $1 \leq 0.5 * \text{Cu}/\text{S} \leq 3$.

103. (New) The method as set forth in claim 99, wherein the steel slab comprises 0.03 ~ 0.2 % of P.

104. (New) The method as set forth in claim 99, wherein the steel slab further comprises at least one of 0.1 ~ 0.8 % of Si, and 0.2 ~ 1.2 % of Cr.

105. (New) The method as set forth in claim 99, wherein the steel slab comprises 0.005 ~ 0.02 % of N, and 0.03 ~ 0.06 % of P.

106. (New) The method as set forth in claim 105, wherein a composition of Al and N satisfies the relationship: $1 \leq 0.52 * \text{Al}/\text{N} \leq 5$.

107. (New) The method as set forth in claim 99, wherein the steel slab further comprises 0.01 ~ 0.2 % of Mo.

108. (New) The method as set forth in claim 104, wherein the steel slab further comprises 0.01 ~ 0.2 % of Mo.

109. (New) A method of manufacturing a bake-hardenable cold rolled steel sheet having excellent formability, comprising the steps of:

hot-rolling a steel slab with finish rolling at an Ar_3 transformation temperature or more to provide a hot rolled steel sheet, after reheating the steel slab to a temperature of 1,100 °C or more,

the steel slab comprising: in weight%, 0.003 ~ 0.005 % of C, 0.003 ~ 0.025 % of S, 0.01 ~ 0.08 % of Al, 0.02 % or less of N, 0.2 % or less of P, 0.03 ~ 0.2 % of Mn, 0.005 ~ 0.2 % of Cu, and the balance of Fe and other unavoidable impurities and,

the composition of Mn, Cu, and S satisfying the following relationships:
 $Mn+Cu \leq 0.3$ and $2 \leq 0.5 * (Mn+Cu) / S \leq 20$;

cooling the steel sheet at a speed of 300 °C/min or more;

winding the cooled steel sheet at a temperature of 700 °C or less and then cold rolling the steel sheet; and

continuous annealing the cold rolled steel sheet so as to obtain the cold rolled steel sheet comprising MnS, CuS, (Mn,Cu)S precipitates having an average size of 0.2 μm or less.

110. (New) The method as set forth in claim 109, wherein the steel slab comprises 0.015 % or less of P.

111. (New) The method as set forth in claim 109, wherein the steel slab comprises 0.004 % or less of N.

112. (New) The method as set forth in claim 109, wherein the number of precipitates is 2×10^6 or more per unit area (mm^2).

113. (New) The method as set forth in claim 109, wherein the composition of Mn, Cu and S satisfies the relationship: $2 \leq 0.5 * (Mn+Cu) / S \leq 7$.

114. (New) The method as set forth in claim 113, wherein the number of precipitates is 2×10^8 or more per unit area (mm^2).

115. (New) The method as set forth in claim 109, wherein the steel slab comprises 0.03 ~ 0.2 % of P.

116. (New) The method as set forth in claim 109, wherein the steel slab further comprises at least one of 0.1 ~ 0.8 % of Si, and 0.2 ~ 1.2 % of Cr.

117. (New) The method as set forth in claim 109, wherein the steel slab comprises 0.005 ~ 0.02 % of N, and 0.03 ~ 0.06 % of P.

118. (New) The method as set forth in claim 117, wherein a composition of Al and N satisfies the relationship: $1 \leq 0.52 * Al/N \leq 5$.

119. (New) The method as set forth in claim 109, wherein the steel slab further comprises 0.01 ~ 0.2 % of Mo.

120. (New) The method as set forth in claim 116, wherein the steel slab further comprises 0.01 ~ 0.2 % of Mo.